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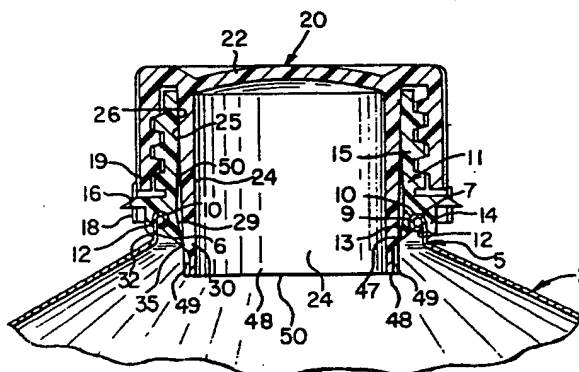
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54 Container closure device and method of making the same.

57 A novel connection for a thermoplastic neck (11) to a stub neck portion (5) of a container (3), comprising a curl (7) on the stub neck portion (5) and a complimentary groove (10) on the neck (11) which cooperate to permit a portion of the neck (11) below the curl (7) to expand when a plug (24) of the closure cap (20), which is threaded onto the neck (11), is inserted into the neck (11). The neck (11) and neck portion (5) have interlocking projections to prevent the neck from turning and the neck (11) and cap having a novel thread arrangement which insures that the plug (24) will properly enter into the neck and provide a good seal which could be frustrated if the neck (11) was permitted to turn.



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CONTAINER CLOSURE DEVICE

This invention relates to a neck assembly for a metal container.

Various types of connections of plastic neck members to a container are known. These connections are normally made while the neck member is at ambient temperature and are snap fits. Such connections, even when tight, rotate frequently. They are difficult to apply or remove the cap threaded onto such rotating neck member. Also in pressurized containers to which the present invention is applicable, a poor seal is obtained. Such closures usually comprise a cap with a plug which wedges into the container neck portions. Any difficulty experienced in applying the cap to the neck portion may cause the cap to cant on the neck portion and thus cause the plug to enter at an angle into the neck bore and provide a poor seal.

Accordingly, the present invention provides a neck assembly for a metallic container, comprising a neck portion on the container having a cylindrical wall with an inwardly turned bead having a smooth annular inner surface and an annular outer surface with radially outwardly extending projection means, a neck member of thermoplastic material having an axial slot at one end of complementary shape to said bead and wall for receiving the same therein, said neck member being heat softenable

such that while in a softened state, said bead and wall of the neck portion may be inserted in said slot so that the projection means deform the plastic material opposing the same to provide pocket means for said projection means.

In a preferred embodiment a cap and the slot in the neck member is provided with inner and outer flanges, the inner flange having a wedge fit with a plug on a closing cap such that during closure, the inner flange is cantilevered against the bead and spread  
10 radially outwardly below the bead, thus effecting a good seal and concurrently drawing the outer flange tightly against the external side of the stub neck and embedding the same between projections found on the neck.

In the drawings:

Fig. 1 is a fragmentary perspective view of a container incorporating the invention,

Fig. 2 is a vertical cross-section view taken substantially on the line 2-2 of Figure 1 on an enlarged  
20 scale,

Fig. 3 is a view similar to Fig. 2 showing the cap partially unthreaded,

Fig. 4 is a fragmentary side-elevation view of the upper portion of the container with the neck applied thereto,

Fig. 5 is a cross-section view taken substantially on the line 5-5 of Fig. 3, and

Fig. 6 is a bottom view of the cap.

Fig. 7 is an enlarged portion of Fig. 2 shown in  
30 the circle.

With reference to the drawings, there is illustrated a metal container generally designated 2, which has a domed upper end 4 and a body 3 has a closed bottom end, not shown. The upper end of the domed upper end portion 4 is formed with a stubbed neck generally designated 5 comprising an annular wall 6 terminating in a C-shaped curl or rim 7 at its upper end.

The curl 7, which is inturned, provides a smooth upper, inner and bottom annular surface 9 which fits complementally into a groove 10 in the lower end of a plastic neck member generally designated 11, the groove 10 is formed at the upper end of a slot 12 which is defined by inner and outer axially extending flange members 13 and 14 which flank the wall 6. Flange members 13 and 14 are formed integral with an upper threaded portion 15 of the neck member. The outer side of the curl 10 7 has radially outwardly extending projections 55 which imbed into the outer flange 14 of the neck member 11. The outer flange 14 is deformed when the neck member 11 is heat-softened prior to application to the stub neck of the container. At such time, the groove 10 in the inner end of the slot also reforms and then conforms to the shape of the curl 7 so as to provide a hermetic seal. The neck member 11 also has a bore with a narrow inner end which is tapered downwardly.

A series of teeth 16 are provided about the 20 lower end of the upper portion 15 of the neck member which cooperate with a pilfer-indicating band 18 which is connected to the lower end of a skirt 19 of a cap, generally designated 20.

The cap 20 is provided with a top wall 22, from which depends a plug 24 having a frusto-conical tapered outer wall surface 25 which cooperates with a surface 26 of the bore 27 of the neck member. The lower end portion of the bore 27 is of reduced diameter and has a frusto-conical sealing surface 29 which tapers downwardly 30 or inwardly of the container and which cooperates with the lower end portion 30 of the plug 24 which wedges into the lower end portion of the bore and expands the flange 13 as shown in Fig. 3 from that shown in Fig. 2, thus cantilevering the portion 13 about the surface 9 and drawing the portion 14 tightly against the cylindrical outer surface 32 of the stub-neck wall 6.

In order to apply uniform pressure about the entire circumference of the lower portion 29 and particularly at the section 35 thereof, it is necessary that the plug or post or stem 24 be prevented from canting within the bore and extend in true axial alignment with the axis of the bore. To this end, there are provided on the neck portion 15 double spiral threads 37, 38 which have coaxial terminal ends 39 and 40. The cap is provided with dual threads 42, 43, thread 42 having its leading end 44 offset 180° from the leading end 45 of the thread 43. Thus, upon application of the cap to the neck member, the cap properly aligns with the neck member so that it is not canted. In this respect, it will be observed that the proper sealing is obtained between the upper section 47 of the lower portion 48 of the plug and the section 35 of the neck member. It will be noted that as the cap is unthreaded from the position shown in Fig. 2, the cap elevates and axially extending slots 49 in the plug which terminate at their upper ends below the portion 47 and extend to the lower end 50 of the post 24 will assume the position shown in Fig. 3. At this time the skirt of the cap will be interthreaded with the threads on the neck and the high pressure gas contained within the container will bleed off through the slots 49 into a space 50 between the periphery 25 of the post and the bore surface 26. The gases will then pass over the top of the neck member to between the threads and then dissipate into the atmosphere.

It will be understood that the neck member may be made of polyethylene, polypropylene or other similar plastic resin material, which for application to the stub neck of the container, is heated to a softening temperature and while in its softened state, is positioned to extend the stub neck portion 6 into the slot between the inner and outer flanges 12 and 13 until the curl snaps into the groove 7. At the same time, the outer side of

of the curl portion, which is formed with outward projections or bumps 55, will form depressions 56 in the outer flange member 14, by the same thus pocketing the bumps of projections 55 within the pockets 56. When the material cools ambient temperature, it hardens.

CLAIMS

1. A neck assembly for a metallic container, characterized by a neck portion on the container having a cylindrical wall with an inwardly turned bead having a smooth annular inner surface and an annular outer surface with radially outwardly extending projection means, a neck member of thermoplastic material having an axial slot at one end of complemental shape to said bead and wall for receiving the same therein, said neck member being heat softenable such that while in a softened state, said bead and wall of the neck portion may be inserted in said slot so that the projection means deform the plastic material opposing the same to provide pocket means for said projection means.

2. A neck assembly according to claim 1, characterized in that said slot is flanked by inner and outer flange portions terminating in a groove complemental to said bead and wall.

3. The assembly of claim 2, characterized by said neck member comprising a bore with a downwardly tapered frusto-conical lower end portion terminating at said inner flange, a cap having a top wall and a tapered plug depending therefrom adapted to fit loosely in the bore and wedge tightly into said tapered lower end portion in sealing position therewith, said cap having a skirt, and said skirt and neck member having a pair of threads on each thereof meshing with the complimentary pair of threads on the other thereof.

4. The assembly of claim 3, characterized by said threads being arranged to allow screwing off of the cap sufficiently to withdraw the plug from sealing position to allow escape of pressurized gases before the cap can be unscrewed sufficiently to cause it to blow off.

5. The assembly of claim 3, characterized by said threads being arranged to cause said cap to thread on evenly onto the neck and thus to accurately position the plug in said bore, the threads on said cap portion having leading ends offset circumferentially from each other.

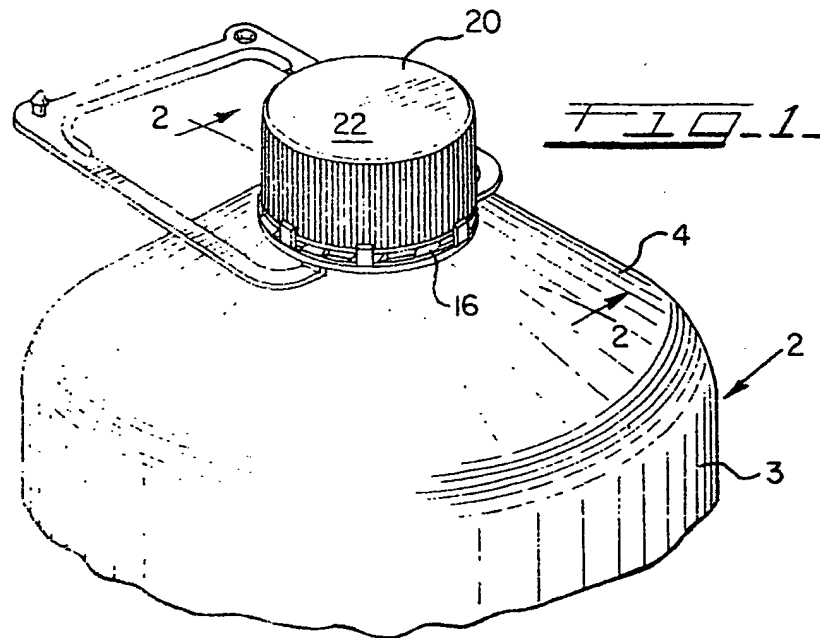
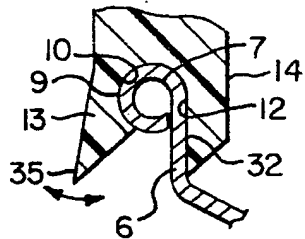
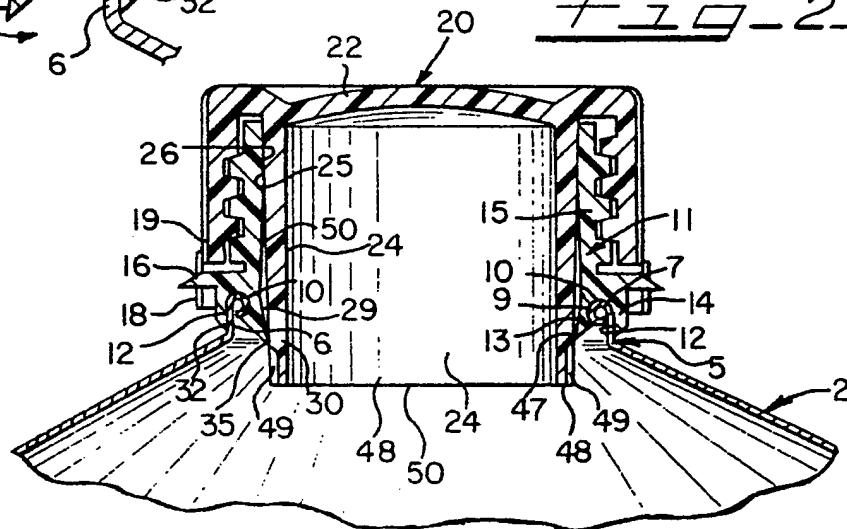
6. The assembly of claim 5, characterized by said threads comprising a pair of spiral threads having leading ends terminating in a common location on the periphery of said neck member and said cap having a pair of threads arranged to engage respective threads on said neck member, said threads on said cap having leading end portions offset circumferentially from each other.

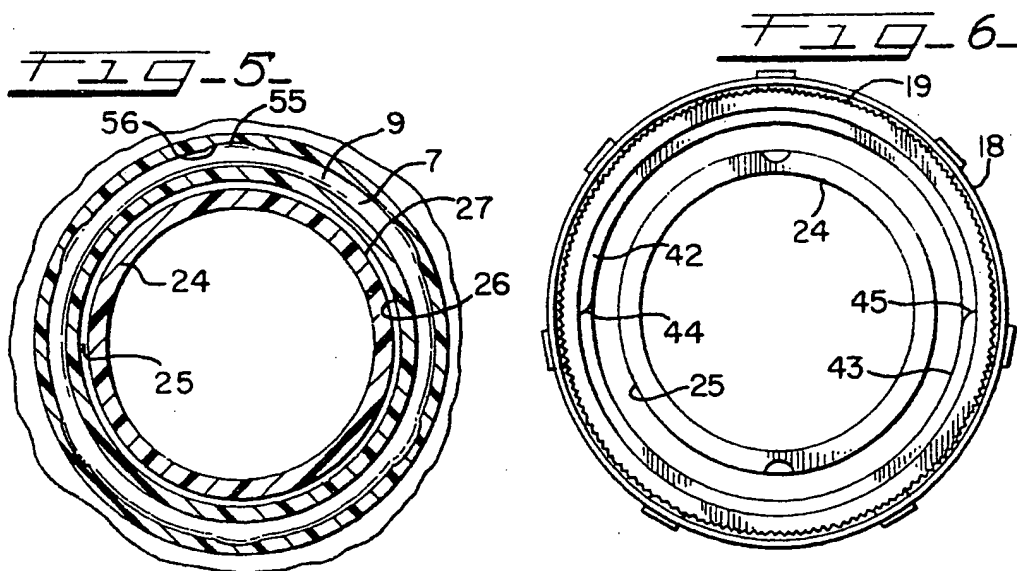
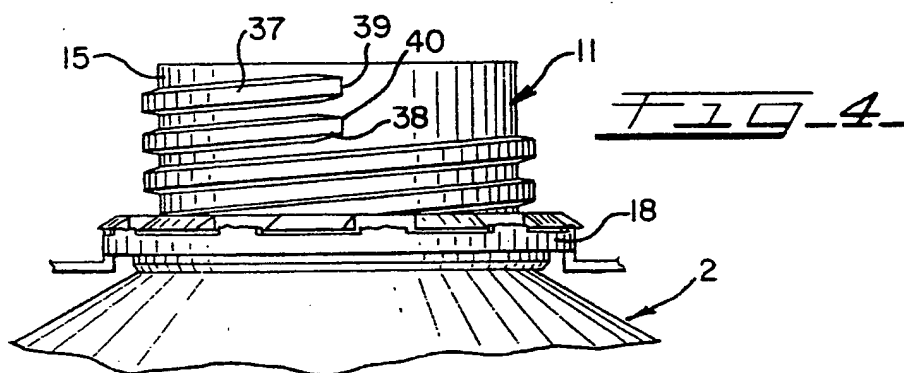
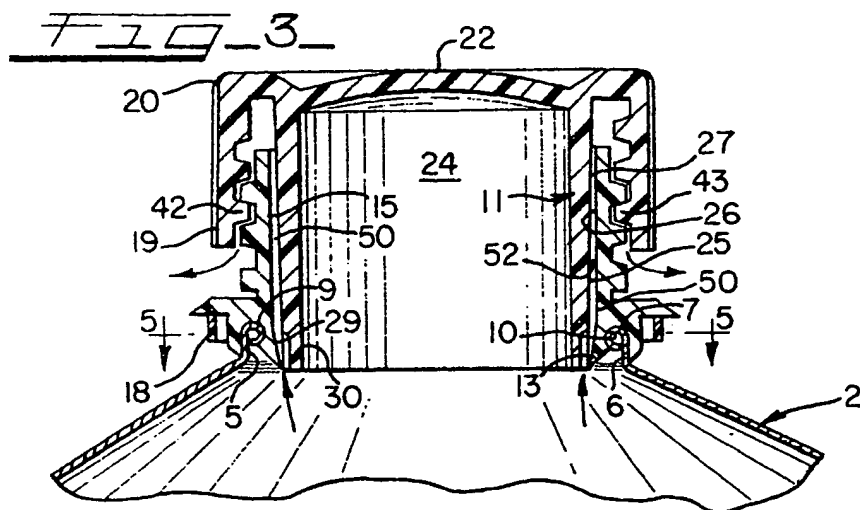
7. The assembly of claim 6, characterized by said cap having a skirt portion and said threads on the cap formed in said skirt and having leading ends offset 180° from each other.

8. The assembly of claim 6 or 7, characterized by said leading ends of said threads being located in a common radial plane on said cap.

9. A method of making a non-rotatable hermetically sealed connection between a thermoplastic neck member and a neck extension of a metallic container, characterized by providing a neck portion on the container having a cylindrical wall with an inwardly turned bead having a smooth annular inner surface and an annular outer surface with radially outwardly extending projection means, providing a neck member of thermoplastic material having an axial slot at one end of complementary shape to said bead and wall for receiving the same therein, heat softening said member and while in a softened state, inserting said bead and wall of the neck portion in said slot so that the projection means deform the plastic material opposing the same to provide pocket means for said projection means and the member conforms complementally on its interior to the opposing surface of the neck member, and cooling the neck member to harden in close fitting sealing engagement with said interior and exterior surfaces of said bead.



FIG. 7FIG. 2





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# EUROPEAN SEARCH REPORT

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EP 80303466.9

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P	<u>EP - A2 - 0 004 743</u> (THE CONTINENTAL) (17-10-1979) + Fig. 3-7 + --	1-4	B 65 D 41/08 B 65 D 47/06
	<u>US - A - 3 122 287</u> (AMERICAN CAN COMPANY) + Fig. 2,3 + --	1,2,9	
	<u>US - A - 3 122 289</u> (AMERICAN CAN COMPANY) + Fig. 3,4 + --	1,2,9	
	<u>DE - A1 - 2 731 882</u> (TETRA PAK) + Fig. 3,4 + --	3,4	TECHNICAL FIELDS SEARCHED (Int. Cl. 3) B 65 D 25/00 B 65 D 41/00 B 65 D 47/00 B 65 D 39/00
	<u>US - A - 2 818 204</u> (CONTINENTAL CAN) + Column 2, lines 46-49; fig. 1 + --	1,4,9	B 65 D 25/00 B 65 D 41/00 B 65 D 47/00 B 65 D 39/00
	<u>US - A - 2 813 664</u> (CONTINENTAL CAN) + Fig. 4-7 + --	1,9	
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	<u>FR - A - 370 664</u> (GOUTTMANN) + Fig. + --	5,6	CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons &: member of the same patent family, corresponding document
X	The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner	
VIENNA	11-12-1980	TROJAN	



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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. <del>X</del> 3
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>US - A - 3 792 793</u> (ROSE) + Fig. + -----	5-8	
			TECHNICAL FIELDS SEARCHED (Int. Cl. <del>X</del> 3